

Assignment # 1

Data Structures and Algorithms

Topic: Arrays

Due date: 18th Sep, 2009

Instructor: Quratulain

1. The median of an array is the element m of the array such that half the remaining numbers in the array are greater than or equal to m and half are less than or equal to m , if the number of elements in the array is odd. If the number is even, the median is the average of the two elements m_1 , and m_2 such that half the remaining elements are greater than or equal to m_1 and m_2 , and half the elements are less than or equal to m_1 and m_2 . Write a JAVA program that accept an array of numbers and returns the median of the number in the array.
2. For the above program, the mode of an array of numbers is the number m in the array that is repeated more frequently. If more than one number is repeated with equal maximal frequencies, there is no mode. Write a method that accepts an array of numbers and returns the mode or indicate that the mode does not exist.
3. Write a program to do the following: Read a group of temperature readings. A reading consists of two numbers: an integer between -90 and 90, representing the latitude at which the reading was taken, and the observed temperature at that latitude. Print a table consisting of each latitude and average temperature at that latitude. If there are no readings at particular latitude, print NO DATA instead of an average. Then print the average temperature in the northern and southern hemispheres (the northern consists of 1 to 90 and southern consists of -1 to -90). (This average temperature should be computed as the average of the averages, not the average of the original reading).
4. Write a program for a chain of 20 department stores, each of which sells 10 different items. Every month, each store manager submits a data card for each item consisting of a branch number (from 1 to 20), an item number (from 1 to 10), and a sales figure (less than Rs100, 000) representing the amount of sales for that item in that branch. However, some manager may not submit cards for some items (for example, not all items are sold all branches). Write a program to read these data cards and print a table with 12 columns. The first column should contain the branch

numbers from 1 to 20 and the word **total** in the last line. The next 10 column should contain the sales figures for each of the 10 items for each of the branches, with the total sales of each item in the last line. The last column should contain the total sales of each of the 20 branches for all items, with the grand total sales figure for the chain in the lower right-hand corner. Each column should have an appropriate heading. If no sales were reported for a particular branch and item, assume zero sales. Do not assume that your input is in any particular order.